Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1. (original) A method for determining placement sites for equipment within a geographic area in a telecommunications network comprising the steps of:

determining a baseline architecture planning area having a tree structure wherein copper cables comprise the branches interconnecting cross-connects, central offices, and subscriber locations;

determining a forecast of customer demand for digital subscriber line service within said baseline architecture planning area and using demographic data for said planning area; and

determining from said forecast the sites in said tree structure where the equipment is to be placed and the type and numbers of such equipment minimizing cost and satisfying design constraints.

Claim 2. (original) The method in accordance with claim 1 further comprising the step of, based on the determination of sites, placing the specific equipment identified and the numbers of such equipment at said sites.

Claim 3. (original) The method in accordance with claim 2 wherein said step of determining the forecast includes accessing a geographic information system containing demographic information on the telecommunications subscribers within said geographic area.

Claim 4. (original) The method in accordance with claim 3 wherein said step of determining said planning area includes the step of determining the boundary of said area based on data received from said geographic information system.

Claim 5. (original) The method in accordance with claim 3 wherein said step of determining said planning area includes the step of creating a network tree having a central office and cross-connects interconnected by cables and subscriber stations connected to cables.

Claim 6. (original) The method in accordance with claim 4 wherein said step of determining said forecast includes acquiring data from said geographic information system as to the central office locations within said boundary, the map of the copper cables within said boundary, subscriber income, and number of telephone lines within said boundary.

Claim 7.(currently amended) ~~The~~ A method ~~in accordance with claim 6 wherein said step of determining said forecast includes~~ for determining placement sites for equipment within a geographic area in a telecommunications network comprising the steps of;

determining a baseline architecture planning area having a tree structure wherein copper cables comprise the branches interconnecting cross-connects, central offices, and subscriber locations and determining the boundary of said area based in data received from a geographic information system;

determining a forecast of customer demand for digital subscriber line service within said baseline architecture planning area and using demographic data for said planning area including accessing said geographic information system containing demographic information on the telecommunications subscribers within said geographic area and acquiring data from said geographic information system as to the central office locations within said boundary, the map of the copper cables within said boundary, subscriber income, and number of telephone lines within said boundary, further ~~includes~~ including fitting a mixed regressive spatial autoregressive logistic (MRSAL) model to selected data from said geographic information system;

determining from said forecast the sites in said tree structure where the equipment is to be placed and the type and numbers of such equipment minimizing cost and satisfying design constraints; and

placing the specific equipment identified and the numbers of such equipment at said sites based on the determination of sites.

Claim 8. (original) The method in accordance with claim 7 wherein MRSAL model is of the form $P(W; x_1, x_2, \ldots, x_k) = 1 / [1 + \exp\{-(\alpha + \rho WP + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k)\}]$.

Claim 9. (original) The method in accordance with claim 8 wherein all the values of W are equal to zero.

Claim 10. (original) The method in accordance with claim 4 wherein said step of determining the sites for placement of equipment includes the steps of:

normalizing the length of cable connected to said subscribers;

determining how subscribers connect to the existing communications network;

determining the available locations for placing the equipment;

constructing a tree network connecting all said available sites; and

optimizing where equipment should be placed at said sites to minimize the total costs of the equipment.

Claim 11. (original) The method in accordance with claim 10 wherein said optimizing step is based on inputs including the set of equipment available to be placed, said tree network connecting all of the candidate equipment sites, and the maximum allowable distance between a subscriber and its serving equipment.

Claim 12. (original) The method in accordance with claim 11 wherein said optimization step is performed with the constraints that no subscriber is too far from its serving equipment, no equipment serves more subscribers than its allowed capacity, all subscribers are served at a site along a path to a central office, and any two subscribers whose copper cables meet on their path to their serving equipment are served at the same equipment location.

Claim 13. (new) The method in accordance with claim 1 wherein said step of determining the forecast includes accessing a geographic information system containing demographic information on the telecommunications subscribers within said geographic area.

Claim 14. (new) The method in accordance with claim 13 wherein said step of determining said planning area includes the step of determining the boundary of said area based on data received from said geographic information system.

Claim 15. (new) The method in accordance with claim 13 wherein said step of determining said planning area includes the step of creating a network tree having a central office and cross-connects interconnected by cables and subscriber stations connected to cables.

Claim 16. (new) The method in accordance with claim 14 wherein said step of determining said forecast includes acquiring data from a geographic information system as to the central office locations within said boundary, the map of the copper cables within said boundary, subscriber income, and number of telephone lines within said boundary.

Claim 17. (new) The method in accordance with claim 14 wherein said step of determining the sites for placement of equipment includes the steps of:

normalizing the length of cable connected to said subscribers;

determining how subscribers connect to the existing communications network;

determining the available locations for placing the equipment;

constructing a tree network connecting all said available sites; and

optimizing where equipment should be placed at said sites to minimize the total costs of the equipment.

Claim 18. (new) The method in accordance with claim 17 wherein said optimizing step is based on inputs including the set of equipment available to be placed, said tree network connecting all of the candidate equipment sites, and the maximum allowable distance between a subscriber and its serving equipment.

Claim 19. (new) The method in accordance with claim 18 wherein said optimizing step is performed with the constraints that no subscriber is too far from its serving equipment, no equipment serves more subscribers than its allowed capacity, all subscribers are served at a site along a path to a central office, and any two subscribers whose copper cables meet on their path to their serving equipment are served at the same equipment location.

Claim 20. (new) A method for determining placement sites for equipment within a geographic area in a telecommunications access network having a tree structure comprising the steps of:

determining a forecast of customer demand for broadband service within each node of said tree network using demographic data for said planning area; and

determining from said forecast optimal sites in said tree structure where the equipment is to be placed and the optimal types and numbers of such equipment minimizing cost and satisfying design and range constraints.

Claim 21. (new) The method in accordance with claim 20 wherein said step of determining a forecast includes fitting a mixed regressive spatial autoregressive logistic (MRSAL) model to selected demographic data.

Claim 22. (new) The method in accordance with claim 21 wherein the selected demographic data is from a geographic information system.

Claim 23. (new) The method in accordance with claim 21 wherein MRSAL model is of the form $P(W; x_1, x_2, \ldots, x_k) = 1 / [1 + \exp\{-(\alpha + \rho WP + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k)\}]$.

Claim 24. (new) The method in accordance with claim 23 wherein all the values of W are equal to zero.

Claim 25. (new) The method in accordance with claim 20 wherein said step of determining optimal sites, types and numbers of said equipment includes a dynamic programming optimization method to minimize the total cost of the placed equipment.

Claim 26. (new) The method in accordance with claim 20 wherein said step of determining optimal sites, types and numbers of said equipment, while satisfying range constraints between each subscriber and its service equipment location, includes computing a function at each network node, where said function provides minimal cost equipment locations, types, and numbers for serving each amount of the forecasted demand within a respective node's subtree, and where said function for each respective node is computed using said function from each of a respective node's children.

Claim 27. (new) The method in accordance with claim 20 wherein said step of determining optimal sites, types and numbers of such equipment, while satisfying range constraints from any subscriber to its assigned network node, includes a dynamic programming optimization method to minimize the total costs of placing the equipment.

Claim 28. (new) The method in accordance with claim 20 further comprising the step of placing the equipment types identified and the numbers of such equipment at said optimal sites.

Claim 29. (new) The method in accordance with claim 20 wherein said step of determining the optimal sites, types, and numbers of the equipment is based on inputs including the set of equipment available to be placed, the tree network connecting the equipment sites, and the maximum allowable distance between a subscriber and its serving equipment location.

Claim 30. (new) The method in accordance with claim 20 wherein said step of determining optimal sites, types, and numbers of the equipment is performed with the constraints that no subscriber is too far from its serving equipment location, no equipment serves more subscribers than its allowed capacity, all subscribers are served at a site along a path to a central office, and any subscribers whose copper cables meet on their path to their serving equipment location are served at the same equipment location.